

REMARKS

Applicants have now had an opportunity to carefully consider the Examiner's comments set forth in the Office Action of March 29, 2006.

Reconsideration of the Application is requested.

The Office Action

In the Office Action, claims 1, 2, 4-7 and 15-19 were allowed.

Claims 8 and 10 were rejected under §103(a) for alleged obviousness based upon U.S. Patent 6,296,752 to McBride et al. in view of U.S. Patent 6,149,789 to Benecke et al.

Claims 11-14 were rejected under §103(a) for alleged obviousness based upon the '752 patent to McBride et al.

In view of the clarifications presented herein, it is respectfully submitted that in addition to the previously allowed claims, claims 8 and 10-14 are in condition for allowance.

A. Rejection of Claims 8 and 10 Under §103(a) Should Be Withdrawn

Claims 8 and 10 were rejected for allegedly being obvious based upon U.S. Patent 6,296,752 to McBride et al. in view of U.S. Patent 6,149,789 to Benecke et al. In support of this rejection, the Examiner asserted:

McBride discloses an apparatus for separating molecules. The apparatus has electrodes for a traveling wave protocol (column 5, paragraph 4) on a substrate containing a two-dimensional array of electrodes (column 5, paragraph 2), the electrodes can be individually controlled by an electronic switching device (column 5, paragraph 3), and the traveling wave protocol can be produced by a multi-phase signal as shown in figure 10. Each electrode can be individually controlled thus a plurality of electrical contacts between the electrodes and the voltage controller must be present in the device of McBride. McBride further discloses the array can contain any number of shapes (column 5, paragraph 2). McBride also discloses in figure 9 a planar conductor providing a voltage potential with respect to the grid that provides a bias field.

The difference between McBride and claims 8 and 10 is McBride does not show a grid arranged in concentric circles.

Benecke teaches a device for manipulating particles utilizing traveling waves. Benecke teaches several arrangements of electrodes including a variety of concentric circle arrangements in figures 8, 9, and 10.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the concentric circle arrangement of Benecke for the point electrode grid of McBride because the arrangement allows centering and decentering of particles and is especially suited to work with living biological cells (Benecke column 7, paragraph 5). Also the

configuration of the electrode grid depends on the specific application of the device and it would be obvious to one skilled in the art to choose a specific one, concentric circle arrangement, for a specific application. Because McBride and Benecke are both concerned with manipulating particles using traveling waves, one would have a reasonable expectation of success from the combination. Thus the combination meets claims 8 and 10.

Pages 2-3 of the Action mailed March 29, 2006.

Independent claim 8 recites a traveling wave grid system comprising, in part, a point electrode grid that includes a plurality of individually addressable point electrodes that are arranged in patterns resembling concentric circles. McBride et al. entirely fail to disclose this aspect, instead teaching an orthogonal array of electrodes in Figs. 6A, 6B, and 7.

U.S. Patent 6,149,789 to Benecke et al. was cited for its teaching of ring-shaped continuous electrodes, such as in Fig. 9. In view of those ring-shaped electrodes, the Examiner asserted that "it would have been obvious to one having ordinary skill in the art...to utilize the concentric circle arrangement of Benecke for the point electrode grid of McBride."¹

However, this assumption is misplaced since it ignores and is contrary to the requisite standards pronounced by the Court of Appeals for the Federal Circuit in making a rejection under §103. "A prima facie case of obviousness can be rebutted if the applicant...can show 'that the art in any material respect taught away' from the claimed invention." *In re Geisler*, 116 F.3d 1465, 1469, 43 USPQ2d 1362, 1365 (Fed. Cir. 1997) (quoting *In re Malagari*, 499 F.2d 1297, 1303, 182 USPQ 549, 553 (CCPA 1974)). *In re Haruna*, 249 F.3d 1327, 58 USQP2d 1517 (Fed. Cir. 2001). "A reference may be said to teach away when a person of ordinary skill, upon reading the reference, ... would be led in a direction divergent from the path that was taken by the applicant." *Tec Air, Inc. v. Denso Mfg. Mich. Inc.*, 192 F.3d 1353, 1360, 52 USPQ2d 1294, 1298 (Fed. Cir. 1999).

A practitioner in this field of art, after reviewing the '752 patent to McBride et al., might arguably be motivated to design a point grid. However, according to the teachings in that patent and the specific illustrations of such in figures 6A and 6B, the grid should be in an orthogonal configuration. Thus, McBride et al. would lead a practitioner interested in a point grid, to utilize an orthogonal configuration for such grid. And, it is also conceivable

¹ The Examiner is respectfully requested to note that claim 8 recites in part, "said point electrodes arranged in patterns resembling concentric circles." Claim 8 does not recite continuous electrodes arranged in concentric circles (as is depicted in the '789 patent to Benecke et al.)

that a practitioner might be motivated to design a ring-shaped electrode as noted in the '789 patent to Benecke et al. However, Benecke et al. teach that such electrodes are continuous electrodes. Benecke et al. entirely fail to even consider the use of a point grid.

There is no motivation in either patent to selectively use certain features of each while selectively ignoring other features, and magically combining the selected features to arrive at the subject matter of the claims at issue which utilize a point electrode grid comprising point electrodes arranged in patterns resembling concentric circles. The present rejection is a classic example of hindsight reconstruction, which the Federal Circuit has long prohibited.²

It is respectfully urged that independent claim 8 and claim 10 dependent therefrom, are distinguishable from the limited teachings of the cited art. Accordingly, the present rejection should be withdrawn and claims 8 and 10 allowed.

B. Rejection of Claims 11-14 Under §103(a) Should Be Withdrawn

These claims were rejected for allegedly being obvious based upon the '752 patent to McBride et al. Specifically, in support of this rejection, the Examiner contended:

McBride discloses an apparatus for separating molecules. The apparatus has electrodes for a traveling wave protocol (column 5, paragraph 4) on a substrate containing a two-dimensional array of electrodes (column 5, paragraph 2), the electrodes can be individually controlled by an electronic switching device (column 5, paragraph 3), and the traveling wave protocol can be produced by a multiphase signal as shown in figure 10. Each electrode can be individually controlled thus a plurality of electrical contacts between the electrodes and the voltage controller must be present in the device of McBride. McBride further discloses separation of particles in the system by providing a fluid medium on top of the grid, then applying a control signal to the electrodes to separate the particles as shown in figure 7. McBride also discloses the separations can be carried out using distinct protocols in each separate direction (column 5, paragraph 2). Figure 7 shows the traveling waves pushing the molecule in the rows and the columns at the same time, however the arrows within the figure are only illustrative possible paths of molecules A and B. The molecules can arrive at the same endpoints in the grid by traveling across the rows and then down the columns, just the same as traveling diagonally.

McBride further discloses a two dimensional separation technique utilizing a protocol in the first direction to separate the particles, and then further using a protocol in the second direction to further separate the particles (column 4, paragraph 3). In this technique, the traveling waves

² "Care must be taken to avoid hindsight reconstruction by using 'the patent in suit as a guide through the maze of prior art references, combining the right references in the right way so as to achieve the result of the claims.'" *Grain Processing Corp., v. American Maize Products Corp.*, 840 F.2d 902, 5 USPQ2d 1788 (Fed. Cir. 1988).

would be sent in one dimension to collect the agent on the one side of the grid before the signal would be sent through the other dimension to further concentrate the sample.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to operate the electrode array grid of McBride by moving the particles first in the horizontal direction (applying control signal to the rows) and then in the vertical direction (applying control signal to the columns) because this method allows the conduction of two-dimensional separations using distinct protocols in each separation direction (column 5, paragraph 2) and mimics the typical two-dimensional electrophoresis utilized within the art and disclosed by McBride to promote separation of the species (column 4, paragraph 3). Operation of the grid in this manner also lengthens the particle path for a species, thus enhancing the separation by subjecting the particle to the separation waves for a longer length of time.

McBride discloses the separation is enhanced utilizing the two dimensions similar to the enhancement seen in 2D gel electrophoresis, thus the concentration of the agent after the second dimension separation occurs is greater than the concentration of the agent after the first dimension separation as in claim 13. Also the first dimension separation still produces a higher concentration than the original as the movement in the first direction enhances the separation of the agent as in claim 14.

Pages 4-5 of the March 29, 2006 Action.

It is respectfully urged that the Examiner's argument, although interesting, is not in accordance with the standard for determining obviousness under §103. The standard is not what "would have been obvious", nor is it proper to speculate what an artisan might do.³ The standard instead, is premised upon what the art teaches.

These concepts now in mind, it is instructive to now reconsider the subject matter of rejected independent claim 11, the specific teachings provided by the '752 patent to McBride et al., and what that patent does not teach.

Claim 11 recites, in part, a method for concentrating an agent dispersed within a fluid medium. The method includes applying a control signal to a first portion of electrodes that are disposed in a first row, and applying the control signal to a second portion of electrodes that are disposed in a second row.

In support of the present obviousness rejection, various passages from the '752 patent are referenced. Figures 5, 6A, 6B, and 7 are cited and passages in column 5, paragraph 2 and column 4, paragraph 3 referenced. The passage in column 4, paragraph

³ "A prior art reference gave 'only general guidance as to the particular form of the claimed invention or how to achieve it' (citation omitted). This 'obvious to try' suggestion... does not render [the claim at issue] obvious, *In re Deuel*, 51 F.3d 1552, 1559, 34 USPQ2d 1210, 1216 (Fed. Cir. 1995), *In re Roemer*, 258 F.3d 1303, 59 USPQ2d 1537 (Fed. Cir. 2001).

3 of the '752 patent is argued to “disclose a two dimensional separation technique utilizing a protocol in the first direction to separate the particles, and then further using a protocol in the second direction to further separate the particles:

FIG. 5 illustrates an embodiment where an electrode-carrying plate 200 has first electrodes 201 and second electrodes 211. The first electrodes 201 can be used to apply a voltage protocol that moves molecules, for example, to apply sequentially greater voltage differences along the separation path to move a native or denatured molecule pursuant a size or pK_a sensitive protocol. pK_a sensitive protocols are often isoelectric focusing protocols that use ampholytes (zwitterionic species) that migrate in an electric field to establish a pH gradient such that molecules migrate to, and focus at, the region corresponding to the molecules' pK_a . Other protocols, such as those described herein, can be used. Certain of the first electrodes 201 can be used to provide a traditional electrophoretic field, for instance the two electrodes that are more towards the edges of the separation path, while the remaining first electrodes 201 can serve to modify the migration pattern of molecules. Note that these first electrodes 201, like second electrodes 211, can be accessed by voltage-supplying leads through conductive vias extending through the substrate that forms electrode-carrying plate 200. The second electrodes 211 correspondingly function to promote or modify a separation in a second a. -direction, the protocol for which is typically applied after the protocol for separation in the first direction. Such a device for two-dimensional separations can be operated correspondingly to the manner in which traditional devices are operated, which typically involves two distinct gel pouring steps to provide gels for the different separation processes. Alternatively, the operating protocols described below can allow a distinction in the separation protocols to be induced by the electrodes, thereby allowing the same separation medium to be used in both processes.

Col. 4, line 46 to col. 5, line 10.

Although this teaching is arguably suggestive of using two voltage protocols to different regions of linear arrays of electrodes, it must be realized that this teaching is not in regards to a point electrode grid. Instead, this description is with regards to collections of linear electrodes. Methods of inducing electrostatic traveling waves across linear electrodes are different than methods, such as in claim 11, involving individually addressable point electrodes.

In regards to a point grid, McBride et al. admit that this is “another embodiment.” The present rejection relies upon a passage in column 5, paragraph 2 of the '752 patent which provides:

In another embodiment, an electrode-carrying plate 300 can contain a two-dimensional array of electrodes 301 of any number of shapes as illustrated in FIGS. 6A and 6B. Such a plate is particularly useful in providing electrically created asymmetrical barriers which act to change the probable specific path of a given molecule as indicated in FIG. 7, where molecule A proceeds by the primary path and molecule B proceeds by an altered path. The asymmetric barriers can be, for example, field-induced changes in pH or viscosity in the vicinity of the electrodes, or localized repulsive fields. The sieving phenomenon that creates selectivity by which differing molecules travel by differing paths is described, for the use of mechanical barriers, in Duke and Austin, *Phys. Rev. Lett.* 80: 1552-1555, 1998 and Elias, *Phys. Rev. Lett.* 80: 1548-1554, 1998. The embodiment of electrode-carrying plate 300 can also be used to conduct two-dimensional separations using distinct protocols in each separation direction.

Col. 5, lines 20-37.

This teaching is with regard to a point grid (as shown in Figs. 6A, 6B, and 7). This teaching fails to suggest the particular operations recited in claim 11. Instead, this passage merely notes that the path of a molecule can be altered from arrow A to arrow B in Figure 7.

The present rejection must be withdrawn because the '752 patent fails to provide any teaching or suggestion as to why or how the point grid embodiment of Fig. 7, which is used to alter the path of a molecule, should be modified to operate as the linear electrode embodiment of Fig. 5, which can be used in conjunction with two voltage protocols applied to different regions of electrodes.

Instead, it is more likely, that a practitioner skilled in this field of art, wishing to devise a method of concentrating an agent in a fluid medium using a point electrode grid (as in claim 11), would be motivated to use a system of linear electrodes as taught by McBride et al. in Fig. 5 and the cited accompanying passage. Thus, the '752 patent actually teaches away from the methodology of claim 11. Moreover, it is improper to mix together and simply pick and choose from the many different and alternate embodiments taught by McBride et al. in the '752 patent.

For at least these reasons, it is respectfully submitted that the present rejection of claims 11-14 must be withdrawn.

CONCLUSION

For the reasons detailed above, it is submitted that claims 8 and 10-14 are now in condition for allowance. The foregoing comments do not require unnecessary additional search or examination.



No additional fee is believed to be required for this Amendment B. However, the undersigned attorney of record hereby authorizes the charging of any necessary fees, other than the issue fee, to Xerox Deposit Account No. 24-0037.

In the event the Examiner considers personal contact advantageous to the disposition of this case, he/she is hereby authorized to call Mark E. Bandy, at Telephone Number (216) 861-5582.

Respectfully submitted,

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Date

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